VERMONT DEPARTMENT OF PUBLIC SERVICE

ELECTRIC AND ECONOMIC IMPACTS OF MAXIMUM ACHIEVABLE STATEWIDE EFFICIENCY SAVINGS 2003-2012

RESULTS AND ANALYSIS SUMMARY

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OVERVIEW

This report estimates the maximum efficiency savings achievable from highly aggressive market intervention strategies over ten years (from 2003 through 2012). The Department of Public Service ("DPS") regards these projections as the most that could be realized throughout Vermont assuming the state pursues aggressive sustainable initiatives designed, as described below, to acquire all achievable savings over the next decade in all efficiency markets: new construction, renovation, replacement, retail product purchases, and both early-retirement and supplemental-measure retrofits on the part of residential, commercial and industrial electricity users.

The achievable savings projections in this report are not a technical potential analysis, i.e., they do not represent theoretical savings assuming all customers install all technically feasible efficiency options. Rather, this estimate of maximum achievable potential represents the market penetration of efficiency technologies that would result if the state made a concerted, sustained campaign involving highly aggressive program strategies. These strategies include:

- Sustained marketing to consumers and upstream suppliers (e.g., equipment manufacturers, distributors and/or retailers);
- Generous financial incentives covering full technology costs, either incremental or installation with labor, depending on market;
- Comprehensive technical and information services to all market participants; and
- Complete customer service delivery.

This analysis shows that if it wanted to, Vermont could more than offset all projected electricity sales growth with efficiency investment (see Table 2). By 2007, five years of

full investment in these all-out efforts would yield 991.2 GWh/year in cumulative annual electricity savings (at meter, as shown in Table 1B). This would represent 15.4% of forecast statewide sales. Over ten years, savings would reach 2,169.6 GWh/yr, by then reducing statewide sales by 30.8%. Peak demand savings would reach 395.2 MW (summer) and 498.7 (winter) at the customer meter (see Tables 3B and 4B, respectively).

If Vermont pursued maximum achievable savings, cumulative annual savings would outpace electricity sales growth anticipated in the 2001 DPS forecast for the entire state. This finding is not applicable evenly across Vermont. There may well be portions of the state where predicted sales growth would outstrip localized achievable efficiency potential. The DPS is involved in other analyses examining geographic targeting of efficiency within Vermont. VELCO is in the process of analyzing the maximum achievable savings from DSM in northwestern Vermont. The distributed utility planning (DUP) collaborative is developing a scoping tool for assessing the maximum achievable savings from targeted DSM in local areas to defer or avoid investments in expanded distribution and sub-transmission capacity.

The analysis also projects and compares the societal benefits and costs associated with maximum achievable electricity savings. As shown in Table 5, each of the residential and commercial and industrial initiatives would be cost-effective, producing between $38.4 million in net benefits (the residential new construction initiative) to $791.3 million for the commercial and industrial initiative for existing customers (present worth amounts in 2003 dollars). After ten years, full investment in all achievable potential would yield $1.4 billion in lifetime net benefits (present worth in 2003 dollars). Realizing this economic bounty would require unprecedented levels of ratepayer-funded spending on efficiency initiatives, ranging from $70 million in 2003 to $184 million in 2008 and 2009 (undiscounted 2003 dollars, as shown in Table 6).

While the total savings from each initiative are cost-effective, not all the technologies are cost-effective for all market populations analyzed at DPS estimates of statewide

avoided costs.[1] Removing the costs and savings from all these uneconomic technologies within the analysis would reduce electricity savings from the initiatives and would increase initiative net benefits, since costs would fall by more than benefits. However, eliminating every technology not found to be generally cost-effective would understate net benefits, since some measures are likely to be cost-effective for substantial minorities of the general customer population, especially among larger users. On the other hand, relatively more of the maximum achievable savings would be cost-effective at higher avoided costs, such as in portions of the state where localized distribution costs can be avoided by targeted efficiency.

Even without optimizing the portfolio of technologies applied to customers throughout the state, this analysis shows that the maximum achievable savings would be economical from each initiative. All told, these sub-optimal savings would still reduce Vermont's energy service costs by 1.4 billion dollars (present worth in 2003 dollars) over the lifetimes of all the technologies installed over the next decade. Consequently, the projected savings in the analysis represent the maximum economically achievable potential for electric end-use efficiency improvement in the state.

Projected electricity savings are above and beyond what would occur naturally in the marketplace in the absence of future market intervention. This makes the potential estimates directly comparable with the 2001 DPS electricity sales forecast, which projects future electricity use. Efficient technology market penetration is expected to rise over time in both the DPS sales forecast and this analysis. This analysis used baseline assumptions consistent with energy intensities in the 2001 DPS sales forecast. Both assume that more stringent building efficiency codes and equipment efficiency standards will raise market penetration of some efficiency technologies, due largely to past market intervention.

[1] For example, LED arrays, an emerging efficiency technology, are not cost-effective; the C&I analysis nonetheless includes their costs and savings.

The maximum achievable potential estimates in this report implicitly include, but do not differentiate, savings that would result from continued operation of Efficiency Vermont at DPS recommended funding levels through 2005. As the DPS found in 1997 with the *Power to Save: A Plan to Transform Vermont's Efficiency Markets*, this analysis once again demonstrates that there is far more than enough efficiency potential remaining in the marketplace to continue with the efficiency utility as Vermont's primary vehicle for acquiring efficiency savings statewide. The difference between this report's projected achievable potential, and the savings expected from current energy efficiency utility ("EEU") programs, represents the remaining savings potential that Vermont could realize from expanded efficiency investment. The analysis likewise demonstrates that there is significant potential remaining beyond that captured by EEU programs for Vermont's electric utilities to exploit through targeted efficiency investment to defer distribution and transmission capacity investment.

APPROACH

This analysis updates and extends the Department's 1997 analysis of economically achievable potential in the *Power to Save: A Plan to Transform Vermont's Efficiency Markets*. The economic analysis uses updated DPS avoided costs for generation, transmission, and distribution avoided costs, as well as avoided fossil fuel cost projections consistent with their electric derivatives. Compared to the original, the savings projections in this analysis are developed at a much finer resolution by end-use, building type, and market.

In the commercial and industrial sector, this analysis estimated savings for over 90 efficiency technologies or technology combinations for 11 building types in new construction, renovation, replacement, retrofit, and retail purchase markets, along with their maximum and base-case market penetrations over the next decade. In the residential sector, the analysis covered 50 efficiency technologies for lighting, refrigeration, air-conditioning, water and space heating, clothes and dishwashers, dryers, and a variety of consumer electronics in new construction, retail products, and retrofit (analyzing two building types in new construction).

Optimal Energy developed individual technology cost and performance characteristics using public and private information sources, including the Technical Reference Manual Efficiency Vermont ("EVT") developed and continually updated and maintained at EVT since 2000.

For the residential analysis, information sources included:

- U.S. EPA Energy Star® program results;
- DPS "Vermont Residential Fuelwood Assessment, 1997-1998" (published in 2000) for appliance saturation estimates;
- Residential Energy Consumption Survey ("RECS") database maintained by the US DOE Energy Information Administration ("EIA"); and
- Historical experience with Vermont retrofit program delivery (e.g. Citizens' RISE program information for fuel-switching costs and performance).

The commercial and industrial ("C&I") analysis drew on:

- The EIA Commercial Building Energy Consumption Survey ("CBECS");
- California Energy Commission measure cost and savings database;
- Publications from national organizations such as American Council for An Energy Efficient Economy, Lawrence Berkeley Laboratory, and New Buildings Institute;
- Utility, statewide, and regional baseline and market assessment studies for areas in the Northeast United States; and
- Communication with manufacturers and vendors.

The main reason the analysis has increased in sophistication is because it is one of several related analyses the project contractor, Optimal Energy, is conducting more or less contemporaneously in Vermont and New York. In Vermont, these other projects include an achievable potential analysis in the northwestern portion of the state for VELCO, and typical savings estimates for a DSM scoping tool for the DUP collaborative. In New York, Optimal Energy is working on an achievable potential study for efficiency and renewables in New York State for NYSERDA. Optimal Energy was able to combine and link the common aspects of these projects to produce a more detailed analysis than would have been possible for any single project alone.

One significant enhancement to the analysis this time is that the distribution of savings across Vermont's electricity energy and demand costing periods are predicated on hourly load shapes for residential and commercial buildings. Distinct load shapes are used for each end use and all 11 commercial and industrial building types. Purchased from Regional Economic Research (RER) by Optimal Energy for the New York analysis, the DPS accepted the recommendation to apply the upstate New York hourly load shapes for Vermont's commercial and residential customers statewide. Other load shapes were developed or updated separately. Optimal Energy relied on professional judgment to supplement information from market assessments and past program experience elsewhere in order to project future market penetration over time.

The residential and commercial and industrial analysis methodologies are summarized below.

RESIDENTIAL SAVINGS ANALYSIS

The residential analysis organized savings potential into three distinct market intervention opportunities: new construction, retail equipment/product sales (alternatively referred to as "time-of-purchase"), and retrofit. Approximately 90 different efficiency measures – representing 50 different efficiency technologies and/or technology "bundles" – were analyzed in these three segments (some measures were analyzed in more than one market segment). This includes several "emerging" technologies – particularly efficient power supplies and heat pump water heaters – that are not yet currently widely available in the market, but are likely to be available in the near future, particularly if actively promoted by efficiency programs.

Average savings, incremental costs and other key "per unit" characteristics of each of the efficiency measures were then developed. For several measures – particularly those for which new minimum federal standards were predicted and emerging technologies – this included estimates of likely reductions in savings (when baselines increase) and/or costs (either due to increasing baselines or economies of scale related to increasing market share) in future years.

Estimates of the size of the market were also developed for each efficiency measure. In the case of new construction, the number of new homes estimated to be built each year was based on changes in population incorporated into the DPS forecast. The size of retail and retrofit markets was generally based on estimates of appliance saturations from DPS' Fuelwood studies and/or EIA's RECS and assumptions regarding the life of the efficiency measure (to gauge typical turnover rates for retail markets).

Some of the efficiency measures analyzed compete for the same efficiency upgrade opportunities (e.g. a fixture with an incandescent bulb can either be replaced with a hard-wired fluorescent lighting fixtures or have its bulb replaced with a compact fluorescent light bulb - "CFL"). In such cases, estimates of the size of the eligible

market were adjusted to ensure that savings were not overstated. Similarly, some efficiency measures could be installed through different market channels. Particularly important is potential overlap between retail markets and retrofit markets (e.g. as retrofit programs directly install CFLs in more and more homes, the potential for retail sales of CFLs decreases). Where the potential for such overlap existed, the size of the retail markets was reduced by the number of efficiency measures predicted to be installed through retrofit activity.

Base case market penetrations – the portion of the market that would buy or install the efficiency measure absent any new efficiency programs – were developed using several sources including Efficiency Vermont assumptions regarding "free rider" rates and the EPA's estimate of current and future market shares for a wide range of ENERGY STAR® products.

Maximum achievable market penetrations were estimated assuming that consumers would either be provided the measure at no cost (retrofit) or provided a rebate equal to 100% of the incremental cost of the measure (retail or new construction). The only exception to this rule was retail sales of CFLs, where rebates were assumed to be equal to 75% of incremental cost. This exception was designed to ensure that the efficient product was not essentially free (this provides some assurance that products purchased will actually be used to generate savings).

In the case of the retrofit analysis, it was assumed that a little more than 70% of all households (including more than 85% of all electric hot water homes and over 90% of all electric space heat homes) would be visited and treated over the 10-year analysis period. That level of activity was assumed to require a significant effort to recruit staff or contractors, train them and establish marketing efforts to generate job leads. Thus, savings in the first few years of the retrofit initiative are assumed to be substantially lower than savings in the last five years.

In the residential new construction market, it was generally assumed that approximately 75% of possible savings would be realized by the fifth program year and 95% by the

10th year. In the retail markets, achievable penetration rates varied by measure. Measures with substantial rebates were assumed to reach very high market shares within a few years. However, many measures available through retail channels have very low (close to zero) incremental cost. Since our analysis assumed that incentives would not exceed 100% of incremental cost, consumer marketing became the primary factor driving up market share for those products. This was assumed to result in slower increases in market share. Market shares for emerging technologies were generally assumed to be 0% for the first couple of years, then ramping up to levels 75% or higher after several additional years. This is particularly true for those technologies (e.g. power supplies) for which the market intervention strategy required regional and/or national coordination.

COMMERCIAL AND INDUSTRIAL ANALYSIS

The C&I analysis takes a "top-down" approach that begins with the total statewide electric sales forecast. The 2001 DPS forecast was broken out into new and existing construction vintage, and then further disaggregated into 11 building types and 9 end-use categories. The breakout by vintage is based on regional forecast assumptions used by the US EIA. The disaggregation by building type is based on 2001 electric sales data from Burlington Electric Department and Central Vermont Public Service. Finally, the breakout by end-use relied on energy intensities (kWh/sq. ft.) for each building type and end use from RER, calibrated to the DPS overall end-use forecast estimates.

Various technology factors are then applied to the new or existing building-type/end-use sales by year to derive the maximum achievable potential for each of the 84 technologies, and for the 4 market types (new construction, renovation, replacement/remodel, and retrofit), resulting in 2,430 separate measure savings estimates for each of 10 years. The basic methodology is summarized by the following equation:

Annual Measure Maximum = Achievable Potential	New or Existing Building End Use KWh Sales Per Year	x Applicability Factor	x Feasibility Factor	x Turnover Factor	X Baseline Adjustment Factor	x Savings Factor	X Annual Net (Achievable Base Case) Penetration

where:

- **Applicability Factor** is the fraction of the end-use level sales that is attributable to equipment that could be replaced by the high efficiency measure (e.g., for packaged air conditioner it is the portion of total cooling load represented by packaged systems). These data came from a variety of baseline and market assessment data.
- **Feasibility Factor** is the fraction of the applicable end-use that is technically feasible for conversion to the high efficiency technology. These data are based on engineering barriers from various studies or judgment.
- **Turnover Factor** is the portion of existing equipment that will be replaced each year and only applies to renovation, remodel and replacement. These data are based on the equipment engineering measure lives from various sources, and estimated renovation and remodel activity.
- **Baseline Adjustment Factor** adjusts existing sales downward for replacement, remodel, and renovation to account for the fact that current standard practice equipment efficiencies are higher than existing stock efficiencies and is based on the relative baseline efficiencies of new and existing stock equipment, from current and historical baseline and market assessment studies.
- **Savings Fraction** is the percent savings (as compared to either existing stock or new baseline equipment) of the high efficiency technology.
- **Annual Net Penetration** is the difference between the Base Case measure penetration underlying the DPS forecast and the measure penetrations that could be achieved with maximum sustained efficiency initiatives. These are estimated based on DPS forecasting inputs, review of past programs and market assessments, combined with professional judgment.

The measure level savings are then applied to hourly load shape data to derive energy impacts by rating period and coincident peak impacts by season. Finally, costs (in $/kWh) for each of the 2,340 measures are applied to capture societal measure costs (full installed cost for retrofit, incremental for other markets).

In addition to estimating the societal measure costs, the analysis also estimates the measure incentive costs by initiative using a set of “achievable budget” penetration curves. These estimate the subset of the overall market activity for each measure that would participate directly in initiatives and collect incentives. Generally, as markets transform, this fraction declines.

INITIATIVE CONCEPTUAL DESIGNS FOR MAXIMIZING EFFICIENCY SAVINGS

Below are summaries of conceptual designs for initiatives to realize maximum achievable savings with strategies the DPS believes would be successful and sustainable over the next decade. These designs form the foundation for projecting the future market penetration in the savings analysis. Each initiative is designed to realize maximum efficiency savings in key residential and commercial and industrial markets throughout Vermont. Residential initiatives focus on new construction, retail product purchases, and retrofit of existing homes. Commercial and industrial initiatives concentrate on efficiency decisions in new construction, in retail product purchases, and in building and equipment retrofit and replacement among existing customers.

The term "initiative" is used over "program" deliberately to connote the broader reach of the efforts to influence efficiency transactions, both up the supply chain from customers, and across the wide variety of transactions that customers can be engaged in at any one time and over time. These initiatives would deploy strategies that cut across customer sectors. All involve the most aggressive forms of market intervention known to have worked in the past in achieving maximum comprehensiveness and maximum market penetration and ultimately, market transformation. The analysis assumes that Vermont undertakes market transformation strategies as part of national or regional campaigns.

The initiatives feature the following common, cross-cutting approaches:

- promotion of the Energy Star® brand for all residential and non-residential products, as well as new construction;
- promotion of advancements in building efficiency codes and equipment efficiency standards;
- transition strategies toward new generations of efficiency;
- focus on customized treatment of non-standard efficiency opportunities; and
- efficiency education in schools to build long-term conservation/efficiency ethic among Vermont's youth (and perhaps informing and motivating parental participation in efficiency initiatives).

RESIDENTIAL INITIATIVES

RESIDENTIAL NEW CONSTRUCTION

This initiative aims to capture savings by increasing the efficiency of residential new construction – both single-family and multi-family. The initiative would aim to increase both the efficiency of the building itself and the efficiency of the various products installed within it. The focus of the initiative would be on efficiency measures that can be promoted – at least in part – through builders. These include:

- Building shell upgrades;
- Hot water equipment efficiency upgrades and fuel choice;
- Fluorescent lighting (both within housing units and in common areas);
- Ventilation fans;
- Dryer fuel type;
- Refrigerators;
- Clothes washers (both within housing units and in common rooms); and
- Dishwashers.

Other products that would ultimately be used in new homes, but whose selection is generally driven solely by the building owner or occupant (e.g. audio-visual equipment, home office equipment, power supplies) would be addressed through the Retail Products Initiative.

The initiative would generally rely on the ENERGY STAR® standard as the definition of efficiency. For example, with respect to building shell and HVAC systems the initiative would promote construction to the ENERGY STAR® performance standard. The initiative would also aggressively promote the use of ENERGY STAR® rated products in the home (ventilation fans, light fixtures, appliances, etc.). It is presumed that the Energy Star® standard will be raised as the market begins to change and baseline efficiencies increase.

Market Barriers

The barriers to efficient new construction are considerable. Chief among them are:

- Builders lack of knowledge or skill regarding both efficient practices and efficient products;
- Mistaken perceptions that some efficient products (e.g. fluorescent light fixtures) are necessarily prone to operating problems or aesthetically unappealing;
- Split incentives – builders have little incentive to focus on energy efficiency since they will not ultimately be paying the energy bills;
- Consumers inability to different between efficient and inefficient homes and products; and
- Limited availability for some efficient products (e.g. fluorescent recessed cans that do not contribute air leakage problems or other types of fluorescent fixtures that are considered aesthetically appealing).

Initiative Strategies

The initiative would employ a variety of strategies to overcome these barriers:

Financial Incentives

The initiative would offer financial incentives to builders for the construction of efficient residential buildings. The structure of the incentives for single family homes would be much like the current incentive structure of Efficiency Vermont's Residential New Construction Program except for the offer of:

- additional incentives for electric hot water savings;
- incentives for (1) meeting the ENERGY STAR® performance standard for building shell, HVAC systems and water heating efficiency, and (2) installing a modest number of efficient light fixtures;
- 100% incremental cost incentives for the installation of efficient electric water heating measures (effort would be made to discourage use of electric water heating, but a significant fraction of new homes are still expected to use it);
- substantial "bonus" incentives for achieving much deeper electrical savings through installation of at least 10 fluorescent fixtures and 3 Energy Star® appliances;

- Incentives for multi-family buildings would be negotiated with builders/developers on a custom basis, much like they are today by EVT; and
- The initiative would generally offer whatever it takes to maximize electric savings (including savings from common area lighting and common clothes washers) while also persuading the builder to construct the shell, HVAC systems and water heating systems to the ENERGY STAR® building performance standard.

In addition to the measures identified for single-family homes, the initiative would also offer a free home energy rating (market value of ~$400 for a single family home) to document attainment of the ENERGY STAR® standard for building shell, HVAC systems and water heating efficiency. The rating would also enable the builder to document compliance with the state building energy code.

Consumer Marketing

Direct consumer marketing would be limited. Greater emphasis would be placed on helping builders market to consumers (see below). The focus of most consumer marketing that does take place would be on promoting the ENERGY STAR® brand.

Trade Ally Marketing

- The initiative would conduct extensive and regular outreach to builders to explain the initiative, educate them on efficient construction practices and recruit them into the initiative.
- The initiative would offer to cost-share consumer advertising conducted by builders who participate in the initiative.
- The initiative would pay for outfitting of model homes with a full range of efficiency measures, along with materials explaining the measures and their benefits to consumers.
- The initiative would continue Efficiency Vermont's recent tradition of sponsoring an annual buildings conference.

Other Key Strategies

- The initiative would work closely with the Vermont Gas Residential New Construction program (as EVT's program has in recent years) to ensure consistency of offerings and messages to builders and consumers.
- The initiative would work with fledgling efforts in different parts of the country to explore the potential for incorporating lighting and appliance efficiencies into the Home Energy Rating System used to certify compliance with the ENERGY STAR® standard. This may better enable the initiative to effectively promote more comprehensive treatment of efficiency opportunities in new construction (particularly with respect to electric efficiency measures).
- Some elements of the initiative – particularly marketing – would be coordinated with regional (e.g. Massachusetts Joint Management Committee, NYSERDA) and national partners (e.g. ENERGY STAR®, Consortium for Energy Efficiency ("CEE") and National Resources Defense Council -"NRDC"). This would help to reduce some initiative costs (e.g. costs of developing marketing materials).
- Promotion of efficiency in new mixed-use developments would be done with one point of contact for the developer, offering the appropriate combination of residential and commercial efficiency services.

RETAIL EFFICIENT PRODUCTS

This initiative aims to capture savings by increasing the efficiency of products bought and sold through "retail" channels. "Retail" is defined broadly. It includes traditional retail stores. However, the initiative would also attempt to address at least some purchases through mail order firms, the Internet and contractors. The initiative would address a wide variety of different products:

- Lighting (lamps, hard-wired fixtures, ceiling fans, torchieres, etc.)
- Appliances
- Water heaters
- HVAC equipment (central A/Cs, furnace fans)
- Audio-visual equipment (TVs, VCRs, DVDs, etc.)
- Home office equipment (computers, printers, etc.)

- Products with external “power supplies” (cordless phones, answering machines, video cameras, tool batter chargers, etc.)
- Other products (exhaust fans, dehumidifiers, etc.)

The initiative would place great emphasis on leveraging of the U.S. federal government’s Energy Star® program – relying wherever possible on the Energy Star® standard as the initiative’s definition of efficiency and basis for determining eligibility for initiative offerings. Energy efficient versions of virtually all of the products listed above currently participate in the Energy Star® program.

Market Barriers

The barriers to investments in efficiency for these products are numerous. While they vary somewhat from product to product, there are a number of common problems:

- Consumers lack of information or misinformation – most consumers are unaware of the differences in energy consumption and (often more important because efficient products are often higher quality) other performance characteristics of efficient and inefficient products;
- Uninformed retail sales staff – many sales people also do not understand the differences in efficiency between different products;
- Poor sales skills – many retail sales people are not skilled at “selling up” to higher priced, higher quality products (a problem exacerbated by high turnover in sales staff);
- Limited availability for some efficient products (e.g. fluorescent recessed cans that do not contribute air leakage problems or other types of fluorescent fixtures that are considered aesthetically appealing);
- Small magnitude of savings for many consumer products makes it hard to get consumers attention – although the absolute magnitude of savings available from many products (e.g. products with power supplies) is relatively small (5-40 kWh/year, depending on the product), the percentage savings are large and the cumulative effect of numerous purchases could be substantial;
- High incremental costs for some products (e.g. clothes washers and heat pump water heaters); and

- Limited availability of some efficient products – although the technology for some major efficiency improvements (e.g. efficient furnace fans, efficient power supplies) has been available and used in niche applications for years, manufacturers have chosen not to incorporate such technologies into the full array of products that they sell (this decision is probably related to several of the other barriers listed above).

Initiative Strategies

This initiative would employ several different strategies to overcome these barriers:

Financial Incentives

- The initiative would offer 100% incremental costs incentives for most products. The principal exception would be lighting products where incentives would be limited to roughly 75% of incremental cost (to increase the likelihood that consumers would use the products to generate savings).
- In most cases, incentives would be offered directly to consumers. However, for some products, the initiative would explore "up-stream" incentives to manufacturers, distributors and/or retailers as a way to both minimize initiative costs (because incremental costs are lower at the wholesale level than the retail level) and ensure products get to market.
  - ✓ Manufacturer incentives are the only viable option for products with inefficient power supplies. It would be necessary to band together with numerous other states (a la SERP – Super Efficient Refrigerator Project) to generate enough funds to convince manufacturers to invest in efficient power supplies for several of the most important consumer products.
  - ✓ Manufacturer incentives may also be the best viable option for achieving maximum savings from furnace fans. As with power supplies, it would likely be necessary to band together with other states to develop an initiative capable of attracting manufacturers' interest.
  - ✓ Manufacturer/retailer incentives could also be tried in lieu of consumer rebates for other products if experiments with "manufacturer initiatives" for lighting bulbs and appliances (this was initiated in fall 2002 in the Northeast) prove effective.

- If necessary, direct "instant rebate" coupons would be used. However, the initiative would explore the possibility of developing a Vermont ENERGY STAR® card analogous to the discount "membership" cards available from most supermarket chains. The initiative would endeavor to make it possible for cardholders to receive discounts on a wide variety of ENERGY STAR® products from a wide variety of stores and other retail channels.

Consumer Marketing

The initiative would use a wide variety of tools to market to and educate consumers. Chief among these would be:

- Point-of-purchase materials;
- Utility bill inserts;
- Direct mail;
- A central web-site;
- Booths at Home Shows;
- Public relations events;
- Outreach to media;
- 800 number consumers can call for expert advice; and
- Limited media advertising.

If the ENERGY STAR® card concept proves feasible, the initiative would also use it as an important marketing tool, much like airlines use frequent flyer cards. Marketing options would include direct mail of educational material to "members", additional rewards for multiple purchases of efficient products, and special recognition of multiple purchasers.

Trade Ally Marketing

- The initiative would conduct regular "outreach" visits to all relevant retail stores in the state (and neighboring states) to keep them informed of initiative developments, answer questions, provide POP marketing materials, etc.
- The initiative would also periodically provide sales training to sales staff of key trade allies.
- The initiative would offer to cost-share advertising focusing on efficient products.

- The initiative would support (financially and otherwise) enhanced displays of efficient products by key trade allies (e.g. lighting & appliance showrooms).

Other Key Strategies

- Many key initiative strategies would be coordinated with regional (e.g. Northeast Energy Efficiency Partnerships, Inc. - "NEEP") and national partners (e.g. ENERGY STAR®, CEE, NRDC). This would help to reduce some initiative costs (e.g. costs of developing marketing materials) and enable the initiative to reach markets (e.g. products with power supplies) in ways that would otherwise not be possible.
- In its early years, the initiative would field test several heat pump water heaters to verify their performance (including non-energy benefits such as dehumidification) in Vermont. This would be a key step to convincing retail stores and contractors to stock and sell them.
- The initiative would continue EVT's current support of national efforts (i.e., the Program for Evaluation and Analysis of Residential Lighting – "PEARL") to test the quality of fluorescent lighting products, with the aim of identifying those that should not be promoted (because they would give the technology an underserved bad reputation). This would be important to the long-term success of efforts to convince consumers to more regularly purchase efficient lighting.
- The initiative would focus primarily on opportunities presented by consumers who have entered the market to purchase an electricity-consuming product on their own accord. However, in the case of refrigerators and freezers it would also attempt to convince consumers with old, inefficient models that are still operating to replace (and recycle) them earlier than they otherwise may have
- The initiative would provide technical training to HVAC contractors on proper sizing and installation of equipment. This effort would have benefits across multiple initiatives (e.g. residential new construction and small commercial).
- The initiative would work with regional and national partners to promote accelerated adoption of new minimum efficiency standards for equipment and (as baseline practices and/or minimum efficiency standards change) tighter ENERGY STAR® standards. As current efficiency technologies become standard and even more efficient technologies are introduced to the market, the initiative would evolve to promote the new generation of efficient products.

RESIDENTIAL RETROFIT

In contrast with the Retail and New Construction initiatives, this one does not attempt to influence market transactions that are already occurring. Instead, it aims to create new transactions. It does this by assessing efficiency potential within a home and then attempting to persuade the building owner to address the cost-effective opportunities identified. It also attempts to create an "efficiency contractor" infrastructure on which consumers can rely for quality work and attempting to drive consumers to use that infrastructure. Among the efficiency opportunities to be addressed are:

- Direct installation of fluorescent lighting products, hot water conservation measures, waterbed insulating pads and pool pump timers;
- Replacement of inefficient old refrigerators, clothes washers and waterbeds (where consumers can be persuaded to change to standard mattresses);
- Weatherization and on-site HVAC system efficiency improvements; and
- Fuel-switching of electric water heaters, electric space heat and electric dryers.

Market Barriers

There are a number of barriers to investments in efficiency in retrofit markets. These include:

- Consumers lack of knowledge of the nature and benefits – energy and non-energy (e.g. reduced fire hazards, better indoor air quality, greater durability of the home) – of efficiency measures;
- Limited infrastructure of quality contractors who can address efficiency opportunities (particularly outside Chittenden County);
- Consumers inability to identify quality contractors who can address efficiency opportunities;
- Limited availability for some efficient products (e.g. fluorescent fixtures that are considered aesthetically appealing);
- Split incentives between building owners who make investment decisions and renters who pay energy bills; and
- High cost of some efficiency measures and many consumers lack of access to capital to cover those costs.

Initiative Strategies

Financial Incentives

- The initiative would directly install all low cost measures – e.g. CFLs, hot water conservation measures – free of charge.
- The initiative would also provide incentives covering 100% of installed cost for high cost measures, including early retirement of inefficient appliances, weatherization and fuel-switching.

Consumer Marketing

- The initiative would endeavor to educate consumers on the potential for efficiency improvements in their home through software designed to assess home energy use and a toll-free number consumers could call with questions regarding their efficiency.
- Initiative services would be directly marketed to consumers in several ways. Most important would be direct telemarketing. Other strategies include bill inserts, web site notices and limited use of media.
- The initiative would also be indirectly marketed to consumers through a network of "efficiency contractors" that the initiative would help create (see below).
- In the first year, the initiative would demonstrate the potential for efficiency improvements through comprehensive retrofit of an example home (or two). The home would then be extensively monitored – energy savings and non-energy benefits such as improvements in comfort would be carefully documented. The results of this effort would be widely publicized as part of an effort to educate consumers of the potential for and benefits of efficiency.

Trade Ally Marketing

- Marketing to trade allies would focus on efforts to create a network of quality "efficiency contractors" (see below). This would be done largely through direct outreach (one-on-one visits) to HVAC contractors, insulation contractors and others whose current businesses are related to efficiency work.
- The initiative would also work closely with a variety of government and non-profit agencies that promote housing conservation and affordable housing to incorporate efficiency improvements into their projects.

Other Key Strategies

- As noted above, the initiative would attempt to build an infrastructure of quality "efficiency contractors" – contractors who understand building science, are adept at important weatherization and HVAC system improvement techniques and can assess a full range of options for efficiency improvements. To that end, the initiative would offer subsidized training and certification/accreditation of efficiency contractors through a process analogous to that of NYSERDA's Home Performance with ENERGY STAR® program. The initiative would also limit subcontracting of initiative work to those contractors who meet its certification/accreditation standards.
- Custom strategies would be developed for treating gut rehab and/or major remodeling opportunities.

COMMERCIAL AND INDUSTRIAL INITIATIVES

Initiatives would be designed and deployed to achieve maximum market penetration of the highest-efficiency technologies among existing and new commercial and industrial customers. Initiative strategies would be organized and executed focusing specifically on efficiency opportunities in three broad markets: existing customer; new customers; and business-to-business equipment sales, lending, and leasing. These three broad markets involve their own unique configurations of market actors and market barriers. The Initiatives would take distinct but integrated approaches to existing and new customers. High-efficiency business product purchases would be promoted through a broad-based efficient products initiative serving both residential and nonresidential buyers.

To achieve maximum impact in the marketplace, marketing and business development efforts would be centrally coordinated to span all markets and reach market actors at all levels in the market supply chain, from end-users through vendors and distributors to manufacturers. The initiatives would also work with public and private entities to focus intensive efforts on policy-makers at the state, local, and national levels to raise building and equipment efficiency codes and standards. These multi-pronged efforts would target "submarkets" with unique alignments of market barriers that impede investment in high-efficiency alternatives.

With few exceptions, the initiatives would offer to pay the full incremental costs of high-efficiency building and equipment choices, whether in the design of new buildings, purchase of new equipment, or early retirement of inefficient equipment and replacement with high-efficiency alternatives. In many cases the initiative would substitute and/or supplement end-user financial incentives with specially tailored payments to upstream market actors to motivate their production, stocking, placement of the highest-efficiency choices. These are much more aggressive than the financial strategies currently used under EEU funding, and would therefore result in much higher and more rapid market adoption of the most energy-efficiency solutions throughout all market opportunities.

NEW CUSTOMERS

Efforts in this market target both new construction and major renovation at existing facilities of non-residential customers. It would promote maximum adoption of economically optimal efficiency solutions using a systems approach capitalizing on interactions between efficiency technologies serving multiple end-uses.
This initiative would structure customized financial incentives to offset the full incremental installed costs for optimal package of cost effective measures. It would also provide incentives or direct payment of the full cost of design assistance and commissioning where appropriate.

The commercial and industrial new construction initiative would pay the full incremental design costs associated with efficiency measures for customer's designers. At the customer's option, it could also facilitate and manage design services using a third party subcontractor. The initiative would sponsor and/or underwrite comprehensive, long term education and retraining of architects and engineers. This campaign would focus on new and innovative ways of thinking about design with a holistic approach, and would include development and dissemination of a detailed architects design guide.

EXISTING CUSTOMERS

The initiative targeting existing customer facilities would promote both high-efficiency retrofit and replacement in existing buildings not undergoing major renovations or additions (which would be served under the new construction initiative). Retrofits include both early retirement of inefficient equipment in current use, and high-efficiency alternatives during the normal course of ongoing equipment replacement decisions.

Financial incentives would be designed to cover the full incremental installed costs of efficient measures (full installed labor and equipment for retrofit measures; incremental labor and equipment for replacement).

The initiative would outsource direct installation of all retrofit measures using a network of private contractors that it would solicit, develop, and manage. The initiative would cover all construction management costs. It would also underwrite all technical and design assistance for retrofit and replacement measures, and for retrocommissioning and commissioning where appropriate.

For projects requiring redesign of existing facilities and systems, the initiative would cover the full incremental design costs. At the customer's options, the initiative would reimburse costs of additional effort required of the customer's designers/vendors, or facilitate and/or managed design, technical assistance, and retrocommissioning and commissioning services. Initiative staff or subcontractors would provide services as appropriate if competitive solicitations are unsuccessful.

COMMERCIAL AND INDUSTRIAL ELEMENTS OF THE EFFICIENT PRODUCTS INITIATIVE

The Efficient Products initiative would promote high efficiency equipment purchased directly by end-users through retail channels. In addition, it would work to transform markets for other plug load equipment that is rented or loaned to end users from manufacturers, distributors or vendors. General features of the C&I component of the efficient products initiative include:

- Coupons for cash incentives covering 100% of the average incremental cost of point of sale retail purchased equipment. These would be redeemed directly by consumers, since many non-residential purchases are made from out of state mail order vendors (e.g., Gateway);
- Co-op advertising with equipment vendors, including mass media broadcast and print targeted to Vermont end users;
- Inventory stocking incentives to participating vendors to carry high efficiency equipment;
- Aggressive marketing to major equipment vendors and manufacturers to encourage participation; and
- Point of sale marketing materials for retail outlets in Vermont (e.g., Staples, Circuit City, etc.)

The Efficient Products initiative would aggressively promote niche opportunities it identifies over time. Efficient refrigerator reach-ins and refrigerated vending machines would be the initiative's first priorities.

REFRIGERATION REACH-INS

The initiative would undertake specific efforts to transform the refrigerator beverage reach-in market. Beverage coolers are owned by the beverage companies, and directly loaned to stores for use with their products. As a result, split incentives increase the barriers to adoption of highly cost effective efficiency measures. The efficient products initiative would work with manufacturers, distributors, vendors, beverage companies and end users to identify all barriers and develop creative solutions to overcome them and permanently transform markets. This would include 100% funding of the incremental costs of manufacturing better reach-ins, along with purchasing agreements throughout the chain of ownership and custody to ensure a viable market for manufacturers. The efficient products initiative would also include policy efforts at the state and national level to modify codes and standards for this equipment.

Reach-ins for general product storage are also sold directly to restaurants and other food service entities. These products would be promoted using the retail product strategies described above.

REFRIGERATED VENDING MACHINES

Vending machines are typically owned by vending companies and placed in service at the end users site, either for a direct rental payment or a percentage of revenue. As a result, they also suffer form similar split incentives, with decisions about equipment purchase made by the vending company. The initiative would work directly with the vending companies, providing 100% incremental cost incentives for developing an inventory of high efficiency machines as they purchase new machines. Marketing would include efforts directed at the end users that would educate them about the benefits of the high efficiency machines, thereby developing demand for the better machines and creating a strong incentive for vending companies to participate.

Through this increased demand the initiative would seek to permanently transform the vending machine market. As with reach-ins, the efficient products initiative would likewise target efforts upstream at manufacturers and distributors, as well as influence state and national codes and standards with targeted information.

In addition to promoting high efficiency vending machines at the time of new vending machine purchase, the efficient products initiative would provide vending miser controls at no cost to vending machine companies to use on all their existing installations. It would also provide vending companies with training on how to educate their customers on the purpose and use of vending miser controls to ensure savings persistence.

BUSINESS DEVELOPMENT TO MAXIMIZE C&I SAVINGS

Business development would seek to convince decision-makers at all levels of market supply chain to produce, distribute, stock, specify, and select the most energy-efficient alternatives economically available. The initiatives would use aggressive business development strategies to serve the three broad residential markets including:

- Outreach and marketing to designers, manufacturers, distributors, vendors, contractors, and customers;
- Efforts leading trade allies to promote efficient solutions to customers, and to deliver and stock efficient equipment;
- Providing technical and sales training and technical information to all upstream actors. Separate but similar efforts would be designed for distributors, vendors and contractors involved in distinct products categories, including: motors, lighting, packaged HVAC equipment, HVAC distribution systems and controls, compressed air and drive controls;
- Customer marketing including mass marketing (direct mail, telemarketing, broadcast and print) supporting personalized outreach to identify opportunities and encourage participation; and
- Specialized efforts targeting trade associations and other relevant groups for each submarket; plus piggyback mailings by trade associations and placement of press releases tailored to specific submarkets in trade association newsletters.

Additional business development efforts using separate combinations of strategies would be tailored to and concentrated on distinct submarkets consisting of particular customer types or trade ally categories involving unique barriers or market structures that require different or additional approaches. Following are the specialized business development activities that the initiatives would target to key submarkets.

HVAC

In addition to working directly with HVAC market actors, the existing customers initiative would participate in the regional Cool Choice program and also work to influence federal standards for HVAC equipment. This would include providing comments and data directly to DOE, as well as to other advocacy organizations, where appropriate.

Motors

In addition to working directly with Motor market actors, the existing customer initiative would participate in the regional MotorUp program and also work to influence federal

standards for motors. This would include providing comments and data directly to DOE, as well as to other advocacy organizations, where appropriate.

The initiatives would also develop an upstream incentive initiative (possibly with MotorUp, depending on regional decisions). This approach would establish quotas for sales of high efficiency motors in Vermont by each participating vendor selling into Vermont. Vendors would receive incentives per motor sold above the quota, and would provide all sales data to EVT on a monthly basis along with invoices. This initiative is modeled after the Southern California Motors program.

Interior Lighting

In addition to the general marketing to specific market actors, the initiatives would provide detailed, comprehensive and extensive education and training to lighting designers, vendors and contractors on lighting design and analysis, including photometric analysis. This would include use of computer modeling to properly assess lighting quality and make informed and optimal choices about the mix of lighting technologies, fixtures, wattages, placement and controls. This would coordinate with and use materials developed by the regional Design Lights Consortium. The initiatives would establish a calculation tool on its web site to assist vendors, lighting designers, vendors and contractors in completing lighting design and analysis.

Exterior Lighting

In addition to the technical and design assistance and financial incentives described as general initiative features, the initiatives would work directly with the Vermont League of Cities and Towns and with individual municipalities to adopt best practices exterior lighting guidelines. This would include training to town planning and zoning commissions to develop outside lighting guidelines as part of town requirements.

Retrocommissioning

While retrocommissioning would qualify as a retrofit measure with the same financial and technical services described above for all measures, the existing customer would structure a specific and aggressive effort at retrocommissioning in existing facilities. This would include training building custodial staff in operation and maintenance

techniques, providing tracking and accounting software to monitor building energy activity, direct retrocommissioning audits and direct performance of all appropriate measures. Retrocommissioning activities would initially focus on specific sub-segments, with schools being the first target.

In addition, the initiatives would participate in the regional Building Operator Certification program, which provides training and certification to building custodial and maintenance staff.

Primary and Secondary Schools

Business development would feature the following approaches:

- Aggressive, frequent and sustained efforts to become directly involved in budgeting and other decision-making processes at all levels of the education administrative infrastructure serving in Vermont. This would include attending meetings and informal involvement with: VT Department of Education, the Vermont Superintendents Association, Superintendents offices, School Boards, and school staff.
- Presentation of projects to town voters, working directly with designers, custodians, etc.
- Upstream effort to incorporate specific purchasing and design guidelines for the Vermont Department of Education (in new construction and renovation) and Superintendents association (for retrofits).

Agriculture

The initiatives would offer free technical and design assistance, construction management, and efficiency measures to farms, and market to farms through farm equipment vendors, and at agricultural trade shows and other tailored strategies. In addition, Business development would work to identify likely cost effective prospects for new farm technologies and support their development. This would build on the successful approach CVPS used in developing variable frequency drive applications for dairy farms.

In addition, the initiatives would work on identifying and developing efficiency measures that would provide farmers with significant other advantages (e.g., better product output, lower production costs, higher product quality). Once identified, these non-energy benefits would be used as key selling points to increase measure adoption.

Industry

Similar to agricultural efforts, the initiatives would offer services that consider the total industrial process system, seeking to identify and exploit opportunities that not only save energy but also increase productivity throughput or quality, reduce waste, or otherwise provide significant productivity or environmental benefits to industrial customers. These tangential benefits would be heavily used to market efficiency opportunities and ultimately lead to greater and more rapid market transformation.

The initiatives would provide, at no cost to the customer, nationally recognized experts in specific industrial processes to review existing processes and develop strategies for improving energy efficiency and productivity throughput or quality, or other benefits. These specialists would assist in developing specifications for modifications, selling the approaches to the customer, and training customer staff on proper use and maintenance of systems.

State and Local Government

The initiatives would work directly with decision makers in state government (both elected and administrative staff) to permanently modify purchasing practices and equipment and design procurement specifications for state buildings.

Business development would work directly with the State Department of Transportation, the League of Cities and Towns, and Municipalities to develop traffic lighting specifications that adopt LEDs (light emitting diode) as standard issue. In addition, the initiatives would develop work plans for each municipality and the state to ensure timely retrofit of all existing incandescent signals to LED.

Water and Wastewater Treatment Facilities

In addition to the technical and design assistance and financial incentives described as general initiative features, the initiatives would work directly with municipalities to assess and adopt opportunities for water and wastewater efficiency. These efforts would include building expertise in specific wastewater treatment technologies, and would also include providing assistance in working with Federal and State government entities to approve and obtain funding for efficiency upgrades.

Colleges and Universities

In addition to the technical and design assistance and financial incentives described as general initiative features, business development would target colleges and universities for specific additional tailored services. These would include: assistance packaging performance contracts; management of all efforts, including contract and construction management, and management and assistance of the decision making process; assistance achieving environmental commitments; and development of initiatives to involve students in efficiency and environmental efforts.

Hospitals

In addition to the technical and design assistance and financial incentives described as general initiative features, business development would target hospitals for specific additional tailored services. Similar to the Colleges and Universities efforts, these would include: assistance packaging performance contracts; management of all efforts, including contract and construction management, and management and assistance of the decision making process; assistance achieving environmental commitments; extensive training of maintenance staff focusing on long term best practices; and development of strategies to ensure hospitals use a systems approach to decisions about equipment upgrades and O&M.

RESULTS

Tables 1 through 4 show annual electric energy and demand savings by initiative by year. Tables 1A and 1B present energy savings at generation and at the customer usage voltage, both incrementally and cumulatively. Table 2 compares customer-level savings with the 2001 DPS sales forecast over the next 10 years. Figure 1 presents the same information graphically. Tables 3A through 4B provide summer and winter peak demand savings at generation and customer voltage. Table 5 provides the benefit/cost analysis results for each initiative. Table 6 provides the undiscounted annual initiative budgets over the ten-year period for efficiency technology financial incentives and for administration, marketing, and delivery. Following is a brief discussion of selected residential and C&I results.

DISCUSSION

Residential electric energy savings start at 22,000 MWh or 1% of sales in 2003, and cumulatively rise to 719,900 after 2012, or 29.9% of residential sales. Over the 10-year period, the majority of maximum achievable savings in the residential sector would come from the retrofit opportunities, followed by efficient products and new construction. In the early years, savings from efficient products dominate. Efficient products savings start out not significantly greater than the 2002 savings projections from the current program, despite an $8 million budget in 2003 (see Table 6). These outcomes are consistent with the initiative design. The 2003 budget to realize maximum achievable savings includes spending of approximately $3 million per year for marketing. The intensive marketing campaign is expected to bear much more fruit in the later years than in the early years of the analysis.

Another reason for these outcomes in the efficient products market is that rebates for clothes washers are about $2.7 million in the first year (out of the total rebate budget of $4 million), with individual rebates of $270. By comparison, rebate spending on high-efficiency washers in the current program is running about $15,000 this year, based on a $50 rebate. The analysis projects a much greater market share - 80% -- than the roughly 30% expected for the current program. Because that 30% of the market enjoys

rebates five times higher than under the current program, the initiative budget increases by significantly more than the savings.

Projected maximum achievable savings in the C&I sector starts at 2.4% of electric sales in 2003, and ramps up to cumulative savings of 31.5% after 2012. Current baseline measure penetrations and future penetration rates both with and without program intervention are estimated separately for each technology, market and building type, based on professional judgment informed by the last approximately decade and a half of utility demand side management experience. However, a few generalizations can be made about the penetration rates.

Retrofit penetrations are constrained by the presumed ability of an efficiency utility to ramp up capability to serve large numbers of customers, assuming no budget constraints. We assume 4% of existing non-residential customers are served in 2003, ramping up to a maximum annual penetration of 10% by 2006, and holding steady until markets start to be saturated in 2010, at which point the start dropping off. Total maximum cumulative retrofit penetration is assumed to be 80%. This is the same as the DPS estimated in 1997 in *The Power to Save,* and also consistent with many past utility DSM plans and potential studies and some of the most aggressive retrofit experiences in North America. The base case assumes a moderate level of 0.5% per year of retrofit activity in the absence of program interventions.

Market-driven penetrations are much more variable, depending on the unique barriers to adoption, technology maturity, non-energy benefits, market structure, available recent market assessments in the Northeast, and past experience. Base case penetrations reflect the assumptions underlying the DPS forecast as much as possible, and make assumptions about likely future codes and standards as well as technology improvements over time. Because the programs intend to ultimately transform markets, achievable potential is measured not by program participation but by the net difference between (a) the overall market penetrations with the initiatives, and (b) the base case penetrations assumed with no market intervention.

For many markets, the net gain in market share is substantially greater than actual estimated program participation, due to efforts directed at upstream market actors. Program budgets generally assume a maximum ultimate participation of no more than about two-thirds of new, renovation or replacement customers. Often efficiency programs can ramp up to mature participation levels in about 3 to 5 years. Therefore, non-measure program costs tend to level off. However, annual incremental program impacts continue to grow because of continued increases in technology market penetrations as compared to base case assumptions.

The non-measure program budgets include all measure-related costs for incremental design and technical analysis work. As a result, they appear to be a substantial portion of total budgets, particularly for the new construction program. In addition, because programs are focused at transforming markets, up front costs for business development and other activities are substantial. Overtime, the portion of total program budgets not associated with technology costs declines.

The commercial and industrial new construction savings projection for 2003 of 4,976 MWh. is slightly lower than both the savings realized in the current program under "new construction" in 2001, and the savings DPS estimated in *The Power to Save* for 2002. There are three reasons for this apparent anomaly:

1. The definition of "new construction" in this analysis is much narrower than that used in Efficiency Vermont's Annual Report and *The Power to Save.* Both include renovation and major remodeling of existing buildings. In the case of *The Power to Save* approximately half of the assumed impacts came from these existing customers.
2. The original analysis assumed 100% participation by all Act 250 participants, predicated a program design that would have required all Act 250 new construction customers to work with the efficiency utility to capture all cost-effective efficiency opportunities. The latest estimates recognize that this full participation and maximum potential estimates are unrealistic.
3. The latest estimates recognize higher new construction baselines than assumed in the previous analysis. For example, much of the savings assumed in *The*

Power to Save included lighting measures which five years later are considered common practice.

As a result of these three factors, the updated new construction estimates are actually much more aggressive than past Efficiency Vermont experience or *The Power to Save* estimates, reflecting the lack of budget constraints for this maximum achievable scenario.

Results Tables and Figures

VERMONT DEPARTMENT OF PUBLIC SERVICE
Maximum Achievable Efficiency Savings by Initiative
Incremental Net Annual MWh at Generation

Year	1	2	3	4	5	6	7	8	9	10
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential										
New construction	2,028	2,266	2,911	5,040	5,553	5,664	5,651	5,168	3,280	5,057
Efficient products	14,832	16,112	19,257	22,615	25,277	26,927	28,948	31,138	33,863	37,442
Retrofit	8,924	15,861	27,917	49,113	86,098	84,731	83,213	81,500	79,486	77,417
Subtotal residential	**25,784**	**34,239**	**50,085**	**76,768**	**116,928**	**117,322**	**117,813**	**117,806**	**116,629**	**119,916**
Commercial and industrial										
New construction	5,839	8,440	5,223	13,846	13,332	10,609	15,880	15,703	19,875	23,799
Efficient products	2,031	3,185	4,432	5,942	6,174	7,112	8,142	8,737	8,999	9,656
Existing buildings (retrofit + replacement)	99,520	129,700	168,489	205,570	208,410	211,404	208,397	187,783	151,589	133,623
Subtotal C&I	**107,390**	**141,325**	**178,144**	**225,358**	**227,917**	**229,125**	**232,419**	**212,223**	**180,462**	**167,079**
TOTAL	**133,174**	**175,564**	**228,229**	**302,126**	**344,845**	**346,447**	**350,232**	**330,029**	**297,091**	**286,994**

Cumulative Net Annual MWh at Generation

	1	2	3	4	5	6	7	8	9	10
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential										
New construction	2,028	4,293	7,204	12,244	17,797	23,461	29,112	34,224	37,438	42,416
Efficient products	14,832	30,944	50,202	72,817	97,928	124,667	153,196	175,938	200,517	227,825
Retrofit	8,924	24,785	52,702	101,815	187,901	272,136	354,316	432,604	506,443	574,109
Subtotal residential	**25,784**	**60,023**	**110,108**	**186,876**	**303,626**	**420,264**	**536,624**	**642,766**	**744,398**	**844,349**
Commercial and industrial										
New construction	5,839	14,263	19,446	33,237	46,477	56,957	72,680	88,055	107,473	130,849
Efficient products	2,031	5,197	9,584	15,445	21,450	28,318	36,085	44,321	52,689	60,737
Existing buildings (retrofit + replacement)	99,520	227,858	393,203	593,302	793,384	988,245	1,175,299	1,327,718	1,433,031	1,513,515
Subtotal C&I	**107,390**	**247,318**	**422,233**	**641,984**	**861,310**	**1,073,520**	**1,284,064**	**1,460,094**	**1,593,194**	**1,705,101**
TOTAL	**133,174**	**307,341**	**532,341**	**828,860**	**1,164,936**	**1,493,784**	**1,820,689**	**2,102,860**	**2,337,591**	**2,549,451**

VERMONT DEPARTMENT OF PUBLIC SERVICE
Maximum Achievable Efficiency Savings by Initiative
Incremental Net Annual MWh at Customer Meter

Year	1	2	3	4	5	6	7	8	9	10
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential										
New construction	1,729	1,932	2,482	4,296	4,732	4,827	4,816	4,404	2,795	4,310
Efficient products	12,659	13,758	16,448	19,318	21,598	23,010	24,739	26,612	28,943	32,004
Retrofit	7,605	13,518	23,791	41,853	73,367	72,197	70,899	69,435	67,713	65,944
Subtotal residential	**21,994**	**29,209**	**42,721**	**65,468**	**99,697**	**100,035**	**100,455**	**100,451**	**99,451**	**102,258**
Commercial and industrial										
New construction	4,976	7,187	4,451	11,767	11,341	9,024	13,463	13,328	16,862	20,186
Efficient products	1,764	2,760	3,839	5,141	5,340	6,140	7,019	7,521	7,730	8,284
Existing buildings (retrofit + replacement)	84,577	110,222	143,181	174,687	177,097	179,626	177,059	159,538	128,788	113,522
Subtotal C&I	91,317	120,170	151,471	191,595	193,777	194,790	197,541	180,386	153,379	141,993
TOTAL	**113,311**	**149,378**	**194,193**	**257,062**	**293,475**	**294,824**	**297,996**	**280,838**	**252,830**	**244,251**

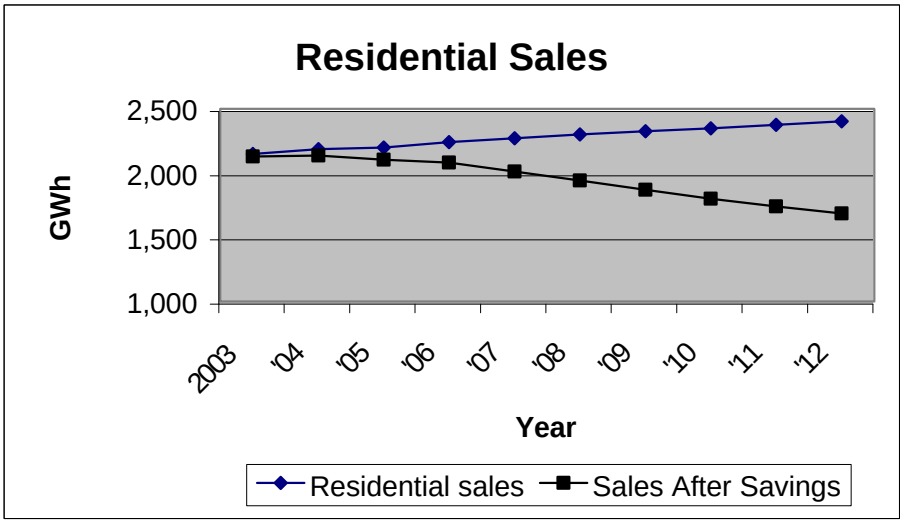
Cumulative Net Annual MWh at Customer Meter

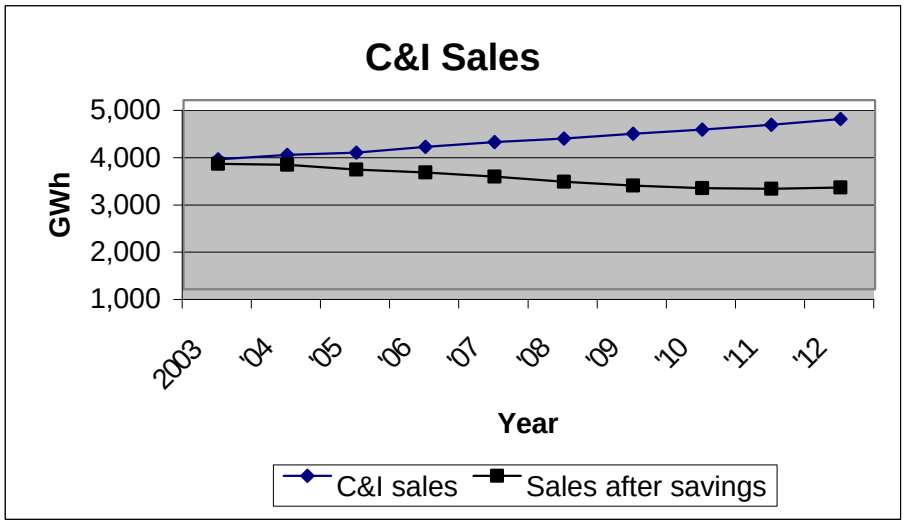
	1	2	3	4	5	6	7	8	9	10
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential										
New construction	1,729	3,662	6,144	10,440	15,172	19,999	24,816	29,173	31,912	36,154
Efficient products	12,659	26,418	42,865	62,183	83,639	106,488	130,869	150,306	171,313	194,655
Retrofit	7,605	21,124	44,915	86,768	160,124	231,897	301,911	368,597	431,478	489,078
Subtotal residential	**21,994**	**51,203**	**93,924**	**159,391**	**258,936**	**358,385**	**457,596**	**548,076**	**634,703**	**719,888**
Commercial and industrial										
New construction	4,976	12,149	16,565	28,286	39,548	48,461	61,791	74,840	91,313	111,139
Efficient products	1,764	4,508	8,308	13,378	18,570	24,499	31,195	38,283	45,469	52,372
Existing buildings (retrofit + replacement)	84,577	193,641	334,146	504,176	674,183	839,771	998,720	1,128,252	1,217,788	1,286,225
Subtotal C&I	91,317	210,297	359,019	545,839	732,301	912,732	1,091,706	1,241,375	1,354,569	1,449,737
TOTAL	**113,311**	**261,500**	**452,943**	**705,231**	**991,237**	**1,271,116**	**1,549,301**	**1,789,451**	**1,989,272**	**2,169,625**

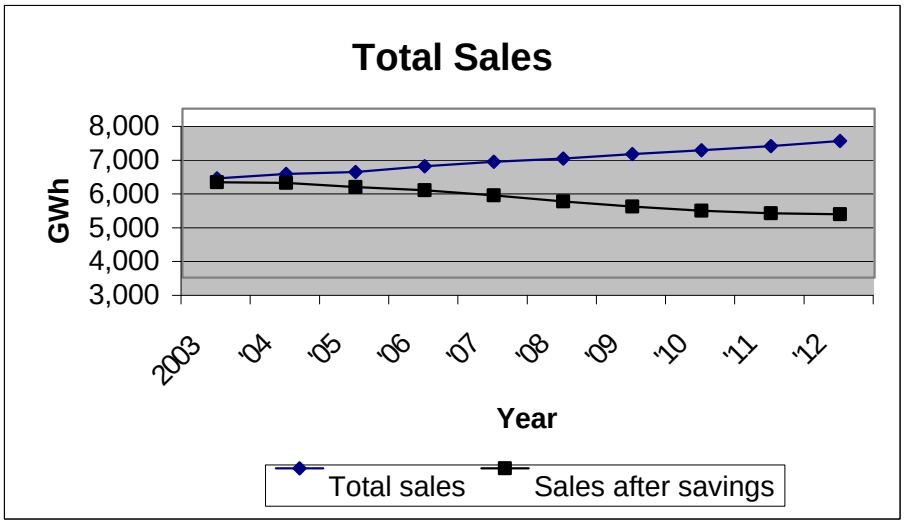
VERMONT DEPARTMENT OF PUBLIC SERVICE
COMPARISON OF MAXIMUM ACHIEVABLE SAVINGS WITH SALES FORECAST (GWH)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential sales	2,149.7	2,186.5	2,197.8	2,240.9	2,271.7	2,299.4	2,326.6	2,348.6	2,374.4	2,404.0
Sales growth		1.7%	0.5%	2.0%	1.4%	1.2%	1.2%	0.9%	1.1%	1.2%
Residential savings	22.0	51.2	93.9	159.4	258.9	358.4	457.6	548.1	634.7	719.9
Savings as % sales	1.0%	2.3%	4.3%	7.1%	11.4%	15.6%	19.7%	23.3%	26.7%	29.9%
Sales after savings	2,127.7	2,135.3	2,103.8	2,081.5	2,012.8	1,941.1	1,869.0	1,800.5	1,739.7	1,684.1
Sales growth after savings		0.4%	-1.5%	-1.1%	-3.3%	-3.6%	-3.7%	-3.7%	-3.4%	-3.2%
C&I sales	3,747.0	3,843.2	3,892.7	4,012.9	4,113.6	4,185.1	4,286.8	4,376.9	4,482.2	4,599.2
Sales growth		2.6%	1.3%	3.1%	2.5%	1.7%	2.4%	2.1%	2.4%	2.6%
C&I savings	91.3	210.3	359.0	545.8	732.3	912.7	1,091.7	1,241.4	1,354.6	1,449.7
Savings as % sales	2.4%	5.5%	9.2%	13.6%	17.8%	21.8%	25.5%	28.4%	30.2%	31.5%
Sales after savings	3,655.7	3,632.9	3,533.7	3,467.1	3,381.3	3,272.4	3,195.1	3,135.5	3,127.7	3,149.5
Sales growth after savings		-0.6%	-2.7%	-1.9%	-2.5%	-3.2%	-2.4%	-1.9%	-0.3%	0.7%
Total sales	5,935.6	6,068.6	6,129.3	6,292.7	6,424.3	6,523.5	6,652.4	6,764.3	6,895.5	7,042.1
Sales growth		2.2%	1.0%	2.7%	2.1%	1.5%	2.0%	1.7%	1.9%	2.1%
Total savings	113.3	261.5	452.9	705.2	991.2	1,271.1	1,549.3	1,789.5	1,989.3	2,169.6
Savings as % sales	1.9%	4.3%	7.4%	11.2%	15.4%	19.5%	23.3%	26.5%	28.8%	30.8%
Sales after savings	5,822.3	5,807.1	5,676.4	5,587.5	5,433.0	5,252.3	5,103.1	4,974.9	4,906.3	4,872.5
Sales growth after savings		-0.3%	-2.3%	-1.6%	-2.8%	-3.3%	-2.8%	-2.5%	-1.4%	-0.7%

Figure 1


Residential Sales
GWh
2,500
2,000
1,500
1,000
2003
'04
'05
'06
'07
'08
'09
'10
'11
'12
Year
Residential sales
Sales After Savings


C&I Sales
GWh
5,000
4,000
3,000
2,000
1,000
2003
'04
'05
'06
'07
'08
'09
'10
'11
'12
Year
C&I sales
Sales after savings


Total Sales
GWh
8,000
7,000
6,000
5,000
4,000
3,000
2003
'04
'05
'06
'07
'08
'09
'10
'11
'12
Year
Total sales
Sales after savings

VERMONT DEPARTMENT OF PUBLIC SERVICE
Maximum Achievable Efficiency Savings by Initiative
Incremental Net Summer Peak MW at Generation

Year	1	2	3	4	5	6	7	8	9	10
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential										
New construction	0.2	0.3	0.4	0.7	0.7	0.7	0.7	0.7	0.4	0.6
Efficient products	1.4	1.5	1.9	2.4	2.7	3.0	3.3	3.7	4.1	4.5
Retrofit	0.9	1.9	3.3	5.7	9.8	9.6	9.4	9.1	8.9	8.7
Subtotal residential	**2.5**	**3.7**	**5.5**	**8.7**	**13.2**	**13.3**	**13.4**	**13.5**	**13.4**	**13.8**
Commercial and industrial										
New construction	1.6	2.2	1.3	3.3	3.2	2.5	3.4	3.4	4.1	4.9
Efficient products	0.0	0.1	0.2	0.3	0.3	0.5	0.6	0.8	1.0	1.1
Existing buildings (retrofit + replacement)	21.6	27.5	35.2	42.5	43.2	43.5	42.7	38.5	31.3	27.7
Subtotal C&I	23.2	29.8	36.7	46.1	46.7	46.5	46.8	42.7	36.4	33.7
TOTAL	**25.7**	**33.5**	**42.2**	**54.8**	**59.9**	**59.8**	**60.2**	**56.2**	**49.8**	**47.5**

Cumulative Net Summer Peak MW at Generation

	1	2	3	4	5	6	7	8	9	10
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential										
New construction	0.2	0.5	0.9	1.6	2.3	3.0	3.7	4.4	4.8	5.4
Efficient products	1.4	2.9	4.8	7.1	9.8	12.8	16.0	19.2	22.7	26.6
Retrofit	0.9	2.8	6.0	11.7	21.5	31.0	40.3	49.1	57.4	64.9
Subtotal residential	**2.5**	**6.2**	**11.7**	**20.4**	**33.6**	**46.8**	**60.1**	**72.7**	**84.9**	**96.9**
Commercial and industrial										
New construction	1.6	3.8	5.1	8.4	11.6	14.1	17.5	20.8	24.8	29.6
Efficient products	0.0	0.2	0.3	0.6	0.9	1.4	2.0	2.7	3.7	4.6
Existing buildings (retrofit + replacement)	21.6	48.8	83.4	124.8	166.4	206.9	245.8	277.8	299.8	316.6
Subtotal C&I	23.2	52.8	88.9	133.9	178.9	222.4	265.2	301.3	328.3	350.8
TOTAL	**25.7**	**59.0**	**100.6**	**154.3**	**212.5**	**269.2**	**325.3**	**374.0**	**413.2**	**447.8**

VERMONT DEPARTMENT OF PUBLIC SERVICE
Maximum Achievable Efficiency Savings by Initiative
Incremental Net Summer Peak MW at Customer Meter

Year	1	2	3	4	5	6	7	8	9	10
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential										
New construction	0.2	0.3	0.3	0.6	0.6	0.6	0.6	0.6	0.4	0.6
Efficient products	1.2	1.3	1.7	2.1	2.4	2.6	2.9	3.2	3.6	4.0
Retrofit	0.8	1.7	2.9	5.0	8.7	8.5	8.3	8.1	7.9	7.7
Subtotal residential	**2.2**	**3.3**	**4.9**	**7.7**	**11.7**	**11.7**	**11.8**	**11.9**	**11.8**	**12.2**
Commercial and industrial										
New construction	1.4	1.9	1.2	2.9	2.8	2.2	3.0	3.0	3.7	4.3
Efficient products	0.0	0.1	0.2	0.2	0.3	0.4	0.6	0.7	0.9	1.0
Existing buildings (retrofit + replacement)	19.1	24.3	31.1	37.5	38.1	38.4	37.7	34.0	27.6	24.4
Subtotal C&I	20.5	26.3	32.4	40.7	41.2	41.0	41.3	37.7	32.2	29.7
TOTAL	**22.7**	**29.6**	**37.3**	**48.3**	**52.9**	**52.8**	**53.1**	**49.6**	**44.0**	**41.9**

Cumulative Net Summer Peak MW at Customer Meter

	1	2	3	4	5	6	7	8	9	10
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential										
New construction	0.2	0.5	0.8	1.4	2.0	2.7	3.3	3.9	4.2	4.8
Efficient products	1.2	2.5	4.2	6.3	8.7	11.3	14.2	17.0	20.1	23.5
Retrofit	0.8	2.4	5.3	10.3	19.0	27.4	35.6	43.4	50.6	57.3
Subtotal residential	**2.2**	**5.5**	**10.4**	**18.0**	**29.7**	**41.3**	**53.0**	**64.2**	**74.9**	**85.6**
Commercial and industrial										
New construction	1.4	3.3	4.5	7.4	10.3	12.4	15.4	18.3	21.9	26.1
Efficient products	0.0	0.1	0.3	0.5	0.8	1.2	1.7	2.4	3.2	4.1
Existing buildings (retrofit + replacement)	19.1	43.1	73.6	110.2	146.9	182.6	216.9	245.2	264.6	279.5
Subtotal C&I	20.5	46.6	78.4	118.1	157.9	196.3	234.1	265.9	289.7	309.6
TOTAL	**22.7**	**52.0**	**88.8**	**136.2**	**187.6**	**237.6**	**287.1**	**330.1**	**364.7**	**395.2**

VERMONT DEPARTMENT OF PUBLIC SERVICE
Maximum Achievable Efficiency Savings by Initiative
Incremental Net Winter Peak MW at Generation

Year	1	2	3	4	5	6	7	8	9	10
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential										
New construction	0.3	0.4	0.5	0.8	0.9	1.0	1.0	0.9	0.6	0.9
Efficient products	2.0	2.1	2.6	3.0	3.4	3.7	4.0	4.3	4.7	5.2
Retrofit	2.0	3.5	6.2	11.0	19.5	19.4	19.3	19.2	18.9	18.7
Subtotal residential	**4.3**	**6.0**	**9.3**	**14.9**	**23.9**	**24.0**	**24.2**	**24.3**	**24.2**	**24.8**
Commercial and industrial										
New construction	1.0	1.5	0.9	2.9	2.6	2.0	3.5	3.2	4.0	4.7
Efficient products	0.0	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.8	0.9
Existing buildings (retrofit + replacement)	23.0	30.2	39.5	48.6	49.2	49.6	49.1	44.3	35.5	31.1
Subtotal C&I	24.0	31.8	40.5	51.7	52.1	52.0	53.1	48.1	40.2	36.7
TOTAL	**28.3**	**37.8**	**49.8**	**66.6**	**76.0**	**76.1**	**77.3**	**72.3**	**64.4**	**61.5**

Cumulative Net Winter Peak MW at Generation

	1	2	3	4	5	6	7	8	9	10
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential										
New construction	0.3	0.7	1.1	2.0	2.9	3.9	4.8	5.7	6.2	7.1
Efficient products	2.0	4.2	6.7	9.8	13.2	16.8	20.7	24.0	27.5	31.5
Retrofit	2.0	5.5	11.7	22.7	42.3	61.7	80.8	99.6	117.9	135.5
Subtotal residential	**4.3**	**10.3**	**19.6**	**34.5**	**58.4**	**82.3**	**106.4**	**129.3**	**151.6**	**174.0**
Commercial and industrial										
New construction	1.0	2.4	3.3	6.2	8.7	10.7	14.2	17.3	21.2	25.9
Efficient products	0.0	0.1	0.3	0.6	0.8	1.2	1.7	2.3	3.0	3.8
Existing buildings (retrofit + replacement)	23.0	53.0	92.0	139.7	187.5	234.2	279.5	317.5	344.4	365.8
Subtotal C&I	24.0	55.6	95.6	146.4	197.1	246.1	295.4	337.1	368.7	395.4
TOTAL	**28.3**	**65.9**	**115.2**	**180.9**	**255.5**	**328.5**	**401.7**	**466.3**	**520.3**	**569.5**

VERMONT DEPARTMENT OF PUBLIC SERVICE
Maximum Achievable Efficiency Savings by Initiative
Incremental Net Winter Peak MW at Customer Meter

Year	1	2	3	4	5	6	7	8	9	10
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential										
New construction	0.3	0.3	0.4	0.7	0.8	0.8	0.8	0.8	0.5	0.8
Efficient products	1.8	1.9	2.2	2.7	3.0	3.2	3.5	3.7	4.1	4.5
Retrofit	1.7	3.1	5.4	9.7	17.1	17.0	16.9	16.8	16.6	16.4
Subtotal residential	**3.8**	**5.3**	**8.1**	**13.1**	**20.9**	**21.1**	**21.2**	**21.3**	**21.2**	**21.7**
Commercial and industrial										
New construction	0.8	1.3	0.8	2.5	2.3	1.7	3.1	2.8	3.5	4.2
Efficient products	0.0	0.1	0.1	0.2	0.2	0.3	0.5	0.6	0.7	0.8
Existing buildings (retrofit + replacement)	20.2	26.4	34.6	42.5	43.1	43.5	43.0	38.7	31.1	27.2
Subtotal C&I	21.0	27.8	35.5	45.3	45.6	45.5	46.5	42.1	35.2	32.2
TOTAL	**24.8**	**33.1**	**43.6**	**58.3**	**66.5**	**66.6**	**67.7**	**63.4**	**56.4**	**53.9**

Cumulative Net Winter Peak MW at Customer Meter

	1	2	3	4	5	6	7	8	9	10
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential										
New construction	0.3	0.6	1.0	1.7	2.5	3.4	4.2	5.0	5.5	6.2
Efficient products	1.8	3.7	5.9	8.6	11.5	14.7	18.2	21.0	24.1	27.6
Retrofit	1.7	4.8	10.2	19.9	37.0	54.0	70.8	87.2	103.2	118.6
Subtotal residential	**3.8**	**9.0**	**17.1**	**30.2**	**51.1**	**72.1**	**93.2**	**113.2**	**132.8**	**152.4**
Commercial and industrial										
New construction	0.8	2.1	2.9	5.4	7.6	9.4	12.4	15.1	18.6	22.7
Efficient products	0.0	0.1	0.3	0.5	0.7	1.1	1.5	2.0	2.7	3.3
Existing buildings (retrofit + replacement)	20.2	46.4	80.6	122.3	164.2	205.1	244.7	278.0	301.6	320.3
Subtotal C&I	21.0	48.7	83.7	128.2	172.6	215.5	258.6	295.2	322.8	346.3
TOTAL	**24.8**	**57.7**	**100.9**	**158.4**	**223.7**	**287.6**	**351.8**	**408.4**	**455.6**	**498.7**

VERMONT DEPARTMENT OF PUBLIC SERVICE
Maximum Achievable Efficiency Savings by Initiative
Societal Benefits and Costs (Present Worth in Thousands of 2003 Dollars)

		Benefits		Costs		Net Benefits	Benefit/Cost Ratio
Residential							
New construction	$	61,632	$	23,268	$	38,364	2.65
Efficient products	$	162,973	$	44,735	$	118,238	3.64
Retrofit	$	469,503	$	248,664	$	220,839	1.89
Subtotal residential	**$**	**694,107**	**$**	**316,666**	**$**	**377,441**	**2.19**
Commercial and industrial							
New construction	$	272,685	$	55,845	$	216,839	4.88
Efficient products	$	19,205	$	9,507	$	9,698	2.02
Existing buildings (retrofit + replacement)	$	1,478,093	$	686,813	$	791,280	2.15
Subtotal C&I	**$**	**1,769,982**	**$**	**752,165**	**$**	**1,017,817**	**2.35**
TOTAL	**$**	**2,464,090**	**$**	**1,068,832**	**$**	**1,395,258**	**2.31**

VERMONT DEPARTMENT OF PUBLIC SERVICE
Maximum Achievable Efficiency Savings by Initiative
Initiative Budgets (in Thousands of 2003 Dollars)

Year	1 2003	2 2004	3 2005	4 2006	5 2007	6 2008	7 2009	8 2010	9 2011	10 2012
RESIDENTIAL										
New construction										
Contributions toward efficient technology costs	$ 1,339	$ 1,352	$ 1,595	$ 2,515	$ 2,436	$ 2,460	$ 2,437	$ 2,206	$ 1,369	$ 2,093
Marketing, administration and delivery	1,778	1,841	1,910	2,164	2,151	2,164	2,159	2,094	1,851	2,066
Total expenditures	$ 3,118	$ 3,193	$ 3,505	$ 4,679	$ 4,587	$ 4,625	$ 4,596	$ 4,299	$ 3,220	$ 4,159
Efficient products										
Contributions toward efficient technology costs (including installation)	$ 3,983	$ 3,738	$ 4,323	$ 5,095	$ 5,116	$ 5,451	$ 5,819	$ 6,215	$ 6,692	$ 7,229
Marketing, administration and delivery	4,028	4,068	4,115	4,171	4,233	4,246	4,258	4,271	4,283	4,296
Total expenditures	$ 8,011	$ 7,806	$ 8,438	$ 9,266	$ 9,348	$ 9,697	$ 10,077	$ 10,486	$ 10,975	$ 11,525
Retrofit										
Contributions toward efficient technology costs (including installation)	$ 3,498	$ 6,570	$ 11,600	$ 20,486	$ 36,086	$ 35,711	$ 35,300	$ 34,837	$ 34,281	$ 33,731
Marketing, administration and delivery	2,211	3,068	4,582	7,275	12,034	11,990	11,935	11,864	11,763	11,670
Total expenditures	$ 5,709	$ 9,638	$ 16,182	$ 27,762	$ 48,120	$ 47,701	$ 47,235	$ 46,701	$ 46,044	$ 45,401
Subtotal residential										
Contributions toward efficient technology costs	$ 8,820	$ 11,660	$ 17,517	$ 28,096	$ 43,637	$ 43,622	$ 43,556	$ 43,258	$ 42,342	$ 43,053
Marketing, administration and delivery	8,017	8,977	10,608	13,611	18,418	18,400	18,352	18,228	17,897	18,032
Total expenditures	$ 16,838	$ 20,637	$ 28,125	$ 41,707	$ 62,056	$ 62,023	$ 61,907	$ 61,486	$ 60,239	$ 61,085
COMMERCIAL AND INDUSTRIAL										
New construction										
Contributions toward efficient technology costs	$ 1,499	$ 2,396	$ 1,415	$ 3,364	$ 3,091	$ 2,506	$ 3,506	$ 3,490	$ 4,258	$ 4,869
Marketing, administration and delivery	2,132	2,309	2,473	2,813	3,015	3,308	3,318	3,329	3,339	3,350
Total expenditures	$ 3,632	$ 4,705	$ 3,887	$ 6,177	$ 6,106	$ 5,814	$ 6,824	$ 6,819	$ 7,597	$ 8,219
Efficient products										
Contributions toward efficient technology costs	$ 300	$ 476	$ 638	$ 823	$ 907	$ 920	$ 944	$ 903	$ 823	$ 736
Marketing, administration and delivery	656	581	502	434	434	484	484	403	403	403
Total expenditures	$ 956	$ 1,057	$ 1,140	$ 1,258	$ 1,341	$ 1,404	$ 1,428	$ 1,306	$ 1,226	$ 1,139
Existing buildings (retrofit + replacement)										
Contributions toward efficient technology costs (including installation)	$ 39,996	$ 52,824	$ 69,315	$ 85,549	$ 91,945	$ 99,275	$ 99,056	$ 92,323	$ 80,487	$ 70,214
Marketing, administration and delivery	8,317	10,635	13,465	15,398	15,385	15,315	14,740	13,413	11,400	9,979
Total expenditures	$ 48,313	$ 63,459	$ 82,780	$ 100,947	$ 107,330	$ 114,590	$ 113,796	$ 105,736	$ 91,887	$ 80,193
Subtotal C&I										
Contributions toward efficient technology costs	$ 41,795	$ 55,696	$ 71,367	$ 89,736	$ 95,943	$ 102,701	$ 103,506	$ 96,716	$ 85,568	$ 75,820
Marketing, administration and delivery	11,106	13,525	16,440	18,646	18,834	19,108	18,543	17,145	15,142	13,731
Total expenditures	$ 52,901	$ 69,221	$ 87,807	$ 108,382	$ 114,777	$ 121,808	$ 122,049	$ 113,860	$ 100,710	$ 89,551
TOTAL										
Contributions toward efficient technology costs	$ 50,615	$ 67,356	$ 88,885	$ 117,832	$ 139,580	$ 146,323	$ 147,062	$ 139,973	$ 127,910	$ 118,873
Marketing, administration and delivery	19,123	22,502	27,047	32,257	37,252	37,508	36,894	35,373	33,039	31,763
Total expenditures	**$ 69,738**	**$ 89,858**	**$ 115,932**	**$ 150,089**	**$ 176,832**	**$ 183,831**	**$ 183,956**	**$ 175,346**	**$ 160,949**	**$ 150,636**